

1. There are 5 female and 4 male candidates in an election for electing a team of 3 city representatives. If the team is formed by choosing three candidates at random, what is the probability that there will be 2 male and 1 female representatives in this 3-member team?
35.7%
2. The monthly worldwide average number of airplane crashes of commercial airlines is 2. Assume that the number of crashes each month follows a Poisson process. What is the probability that there will be more than 2 crashes in the next month?
32.3%
3. Among the customers visited the auto repair shop A, 30% of them are for oil change. Each day the shop only accept 10 customers. What is probability that in a given day there will be less than 2 customers (i.e., one or none) asked for oil change out of the 10 customers?
14.9%
4. For an investment, if it is successful, one will earn \$1200 in profit, and if it fails, one will lose \$700. If the probability that the investment will be successful is 40%, and, of course, the chance of failure is 60%, what is the expected value of this investment?
\$60
5. Let the p.m.f. of a random variable X be defined by $f(x) = \frac{x+1}{6}$, $x = 0, 1, 2$.
 - a) Find $P(X \geq 1)$
5/6
 - b) Find the expected value of X .
4/3
 - c) Find the variance of X .
5/9
 - d) Let $Y = 2X - 1$, find the expected value and variance of Y .
5/3 and 20/9
6. Determine which of the following functions is(are) not proper probability mass functions. (Explain)

$f(x) = \frac{x^2}{10}$, $x = -2, -1, 1, 2$. **Yes, it is a proper probability mass function.**

$f(x) = \frac{x}{10}$, $x = -3, -2, 0, 1, 2, 3, 4, 5$. **No, it is not a proper probability mass function.**
7. Assume that the distribution of the weights of a certain type of rats is approximately normal (bell-shaped) with a mean 1.8 and standard deviation of 0.2 lbs.
 - a) Approximate the percentage of this type of rats with weights between 1.5 to 2.2 lbs.
0.9104
 - b) Approximate the 60th percentile.
1.85
8. In the study, the fear of negative evaluation (FNE) score was produced. The higher the score, the greater is the fear of negative evaluation. Suppose that the FNE scores of a population have a mean of 20 and standard deviation of 4. If a random sample of 36 individuals from this population is selected, what is the probability that the average FNE score of this sample is higher than 21.5?
0.0122
9. If a balanced die is casted 30 times, what is the probability to see a 6 for 10 times or more? (Use the normal approximation to binomial probability.)
0.0136